



Name: _____ Date: _____ Group: _____

STUDENT JOURNAL

Protons and Electrons

Part I: Protons, Electrons, and Neutrons

	1. Neutral Atom of Hydrogen	
	Atomic Number = 1	Atomic Mass = 1 (rounded)
	Number of protons = 1	Number of neutrons = 0
	Number of electrons = 1	Number of Energy Levels = 1
	Is the last energy level full? No	
	2. Neutral Atom of Helium	
	Atomic Number = 2	Atomic Mass = 4 (rounded)
	Number of protons = 2	Number of neutrons = 2
	Number of electrons = 2	Number of Energy Levels = 1
	Is the last energy level full? Yes	
	3. Neutral Atom of Lithium	
	Atomic Number = 3	Atomic Mass = 7 (rounded)
	Number of protons = 3	Number of neutrons = 4
	Number of electrons = 3	Number of Energy Levels = 2
	Is the last energy level full? No	
	4. Neutral Atom of Beryllium	
	Atomic Number = 4	Atomic Mass = 9 (rounded)
	Number of protons = 4	Number of neutrons = 5
	Number of electrons = 4	Number of Energy Levels = 3
	Is the last energy level full? No	

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Part I: Protons, Electrons, and Neutrons, continued

	5. Neutral Atom of Boron	
	Atomic Number =	Atomic Mass = (rounded)
	Number of protons =	Number of neutrons =
	Number of electrons =	Number of Energy Levels =
	Is the last energy level full?	

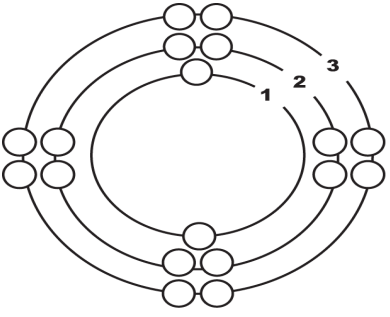
	6. Neutral Atom of Carbon	
	Atomic Number =	Atomic Mass = (rounded)
	Number of protons =	Number of neutrons =
	Number of electrons =	Number of Energy Levels =
	Is the last energy level full?	

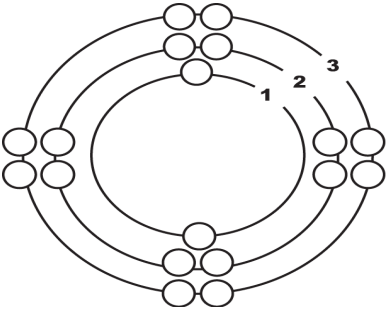
	7. Neutral Atom of Nitrogen	
	Atomic Number =	Atomic Mass = (rounded)
	Number of protons =	Number of neutrons =
	Number of electrons =	Number of Energy Levels =
	Is the last energy level full?	

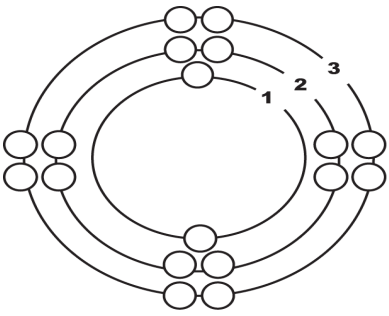
	8. Neutral Atom of Oxygen	
	Atomic Number =	Atomic Mass = (rounded)
	Number of protons =	Number of neutrons =
	Number of electrons =	Number of Energy Levels =
	Is the last energy level full?	

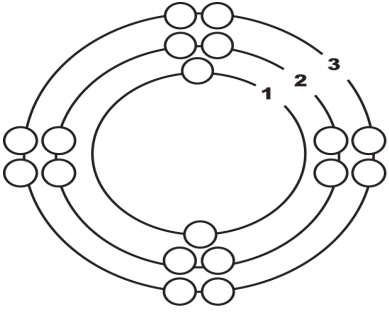
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Part I: Protons, Electrons, and Neutrons, continued

	9. Neutral Atom of Fluorine	
	Atomic Number =	Atomic Mass = (rounded)
	Number of protons =	Number of neutrons =
	Number of electrons =	Number of Energy Levels =
	Is the last energy level full?	

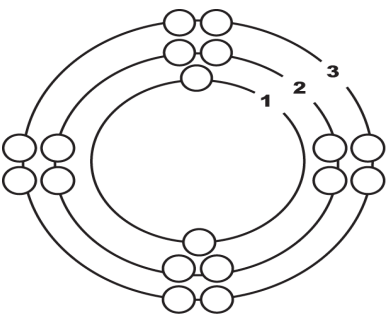
	10. Neutral Atom of Neon	
	Atomic Number =	Atomic Mass = (rounded)
	Number of protons =	Number of neutrons =
	Number of electrons =	Number of Energy Levels =
	Is the last energy level full?	

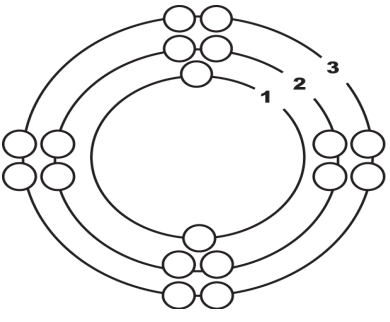
	11. Neutral Atom of Sodium	
	Atomic Number =	Atomic Mass = (rounded)
	Number of protons =	Number of neutrons =
	Number of electrons =	Number of Energy Levels =
	Is the last energy level full?	

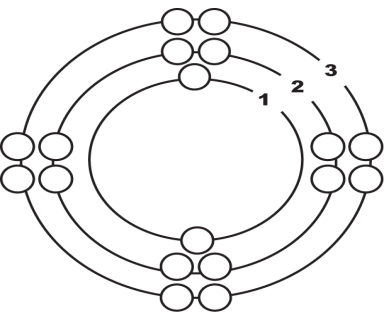
	12. Neutral Atom of Magnesium	
	Atomic Number =	Atomic Mass = (rounded)
	Number of protons =	Number of neutrons =
	Number of electrons =	Number of Energy Levels =
	Is the last energy level full?	

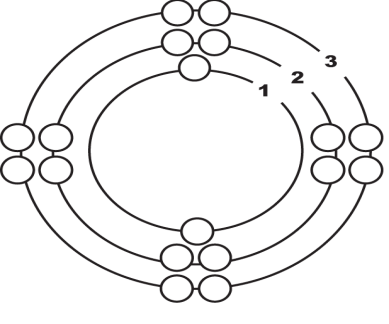
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Part I: Protons, Electrons, and Neutrons, continued

	13. Neutral Atom of Aluminum	
	Atomic Number =	Atomic Mass = (rounded)
	Number of protons =	Number of neutrons =
	Number of electrons =	Number of Energy Levels =
Is the last energy level full?		

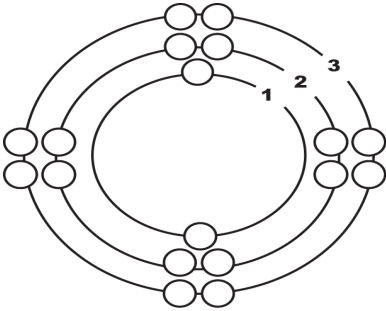
	14. Neutral Atom of Silicon	
	Atomic Number =	Atomic Mass = (rounded)
	Number of protons =	Number of neutrons =
	Number of electrons =	Number of Energy Levels =
Is the last energy level full?		

	15. Neutral Atom of Phosphorus	
	Atomic Number =	Atomic Mass = (rounded)
	Number of protons =	Number of neutrons =
	Number of electrons =	Number of Energy Levels =
Is the last energy level full?		

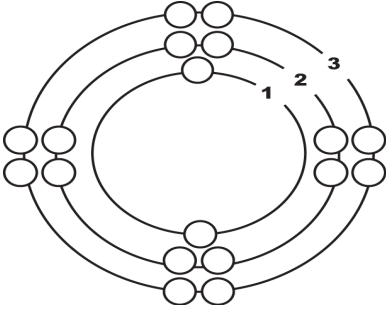
	16. Neutral Atom of Sulfur	
	Atomic Number =	Atomic Mass = (rounded)
	Number of protons =	Number of neutrons =
	Number of electrons =	Number of Energy Levels =
Is the last energy level full?		

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Part I: Protons, Electrons, and Neutrons, continued



17. Neutral Atom of Chlorine	
Atomic Number =	Atomic Mass = (rounded)
Number of protons =	Number of neutrons =
Number of electrons =	Number of Energy Levels =
Is the last energy level full?	



18. Neutral Atom of Argon	
Atomic Number =	Atomic Mass = (rounded)
Number of protons =	Number of neutrons =
Number of electrons =	Number of Energy Levels =
Is the last energy level full?	

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Part II: Valence Electrons and Reactivity

Use your completed diagrams from Part I and information about valence electrons and reactivity from Part II of the *Student Guide* to complete the chart below. Hydrogen is a special case and has been completed for you. Helium and Lithium have been completed as examples.

Neutral Atom	Number of valence electrons (refer to diagrams of Part I)	Place a ✓ in the column that best describes the reactivity of the elements valence shell based on Part II of the Student Guide			
		Tend to lose 1, 2, or 3 electrons to other atoms	Tend to gain 1, 2, or 3 electrons from other atoms	Tend to share electrons	Not reactive, valence shell is full
1. Hydrogen	1	✓	✓	✓	
2. Helium	2				✓
3. Lithium	1	✓			
4. Beryllium					
5. Boron					
6. Carbon					
7. Nitrogen					
8. Oxygen					
9. Fluorine					
10. Neon					
11. Sodium					
12. Magnesium					
13. Aluminum					
14. Silicon					
15. Phosphorus					
16. Sulfur					
17. Chlorine					
18. Argon					

Answer the questions on the next page based on the completed chart.

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Part II: Valence Electrons and Reactivity, continued

Refer to the chart on the previous page and your diagrams to answer these questions.

1. Will helium, neon, or argon atoms react with other atoms? ____ Why or why not?

2. Use the chart to explain why the atoms of carbon and silicon differ from the other atoms listed.

3. If two electrons are removed from beryllium during a reaction, which energy level becomes the valence shell?

4. If one electron is removed from sodium during a reaction, which energy level becomes the valence shell?

5. Does it make sense that a chlorine atom would accept two electrons? _____ Why or why not?

6. A neutral hydrogen atom is a special case as it can accept, remove, OR share electrons during reactions with other atoms. If the electron is removed from hydrogen, the remaining positive proton number in the atom is _____ and remaining negative electron number is _____. Do you think this atom is still neutral? _____ Why or why not?

7. Describe the reactivity of atoms of the following elements. Use the words reactive (or reactivity), valence shell, lose electrons, gain electrons, and share electrons in your sentences when they can be used for each of the elements.

Hydrogen:

Neon:

Carbon:

Fluorine:

Sodium:

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Part III: Identifying Elements

Mystery Atoms

1. Identify the name of the element based on the clue provided. Use the Periodic Table to determine the name of each atom.

Mystery Atoms		
Clue: This element is made from atoms with...	Predicted identity	Actual identity (teacher provided)
6 neutrons		
47 protons		
10 neutrons		
92 protons		
14 neutrons		
18 protons		

2. Is it better to use the number of protons or the number of neutrons to determine what type of element an atom represents? *Explain.*
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Reflections and Conclusions

1.The number of _____ can be used to identify an element.

2.How can the number of electrons be predicted in a neutral atom?

3.What are valence electrons?

4.How are valence electrons used to determine an atom's reactivity?

5.What is the Octet Rule?
